15¢
$5.50 A YEAR
March 13, 1954
VOL. 65, NO. 11 PAGES 161-176

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Tops in Talent

See Page 166

A SCIENCE SERVICE PUBLICATION

Kodak reports to laboratories on:

identifying multicarbide phases by color photomicrography... reproducing pictures on a photocopying machine... some things you can do with oxidized cellulose

Metallography in color

Meet Mr. Foster. Charles S. Foster is our ace photomicrographer. Charlie's function with us is to dole out individualized advice on how most expeditiously to get where you want to go with a photomicrographic or metallographic undertaking.

A year or two ago the chief metallographer in the Powder Metals Research Department at Firth Sterling Inc. in Pittsburgh thought he would ask Mr. Foster for a little help on the problem of identifying constituents and phases in multicarbide mixtures through photomicrography in color. *Steel* carried a short illustrated article on the results. It may turn out to be something of a landmark in metallography.

The technique is heat-tinting at 900 F for 5 minutes after careful polishing and electrolytic etching in 5% sodium carbonate. The various phases assume characteristic colors: grey for tungsten carbide grains, yellow for tantalum carbide, tan for the solution areas of tungsten carbide plus titanium carbide, deep purple for the eta phase formed by carbon deficiency, blue for the cobalt matrix, and so on. Though Mr. Foster is no metallurgist, he did prove helpful on the important matters of illumination and filtering to record these color nuances reproducibly on *Kodak Ektachrome Film, Daylight Type.*

Bulking large in making the project practical was the fact that this film can be processed on the spot to judge the results.

Perhaps life is not really that simple, but we like to think that in superior creep properties, better service in jet engine blades, etc., Firth Sterling products are now or soon will be reflecting the knowledge gained through heat-tinting.

Mr. Foster will be most happy to send you a reprint of the Steel *article if you want to see color reproductions of Firth Sterling's heat-tinted carbides at 1500 diameters. Also, if you have problems of your own in photography through the microscope, don't hesitate to write him about them. His address: Eastman Kodak Company, Industrial Photographic Division, Rochester 4, N. Y.*

Predotted

The trouble with drawing reproduction materials is that they do not give intermediate densities. They just cannot handle the gradations of light and darkness that make up what everybody thinks of as a "photograph."

Let us, then, solve this problem just as printers do with ink. Let us break up a picture into tiny dots, all of the same density but of varying size. But, instead of using a great big process camera with trick stops in the lens and ruled glass screen placed just so many thousandths of an inch in front of the film, let's just use an ordinary camera to copy your picture on some all-or-none film that has a dot structure pre-exposed into it at the factory. Make a negative that way; combine it with any drawn, printed, or written material you want; and make your photocopies of the whole thing as a unit.

Very well, you may ask, but where can you get such factory-predotted film? Answer: from your favorite Kodak Graphic Arts Dealer. If you don't believe it, call him up right now and ask him to rush you out a box of his brand-new Kodalith Autoscreen Ortho Film. *If his name escapes you, write Eastman Kodak Company, Graphic Arts Division, Rochester 4, N. Y.*

Slightly degenerated cotton

Instead of oxidizing cellulose as man has done from time immemorial to take the chill out of his bones, cook his dinner, and dispel his gloom, we have a trick of oxidizing it only to a 10% to 22% carboxyl level. This we do by treatment with nitrogen dioxide. The product, called, surprisingly enough, "oxidized cellulose," looks like this:

It has the appearance and even some of the strength of ordinary cotton, along with some rather extraordinary properties. The most recent of these to come to light is its use in the diagnosis of congenital hyperplasia (enlargement) of the adrenal gland in children. This comes about from the remarkable affinity of oxidized cellulose for ACTH, which it absorbs quantitatively. ACTH is not detectable in the blood of normal children but does appear where this affliction exists. After cortisone treatment, no ACTH is detectable.

This is not the debut of the stuff as a tool in the healing art. Its first flush of prominence a few years ago was based on the surgically useful fact that it has the physical attributes of cotton gauze, yet is wholly absorbed in the blood stream after fulfilling its mechanical function.

Aside from its medical use, oxidized cellulose is an ion exchange medium, plucking cations out of aqueous solution to form metallic salts of cellulose. Plain cotton as far as the eye can see and the finger can feel, it bewitchedly vanishes into solution when popped into a 2% sodium hydroxide solution. When kept dry and cold, however, it survives indefinitely without change.

Trimming the cellulose chains with 10 to 22 percent of carboxyls drives the price of cotton up to $62.25 per pound, FOB Kingsport, Tenn. If you can develop some decent volume of demand for it, we'll probably drop the price. For the cold facts, write Eastman Chemical Products, Inc., Chemical Division, Kingsport, Tenn. (Subsidiary of Eastman Kodak Company.)

Price quoted is subject to change without notice.

Kodak
TRADE-MARK

This is one of a series of reports on the many products and services with which the Eastman Kodak Company and its divisions are . . . *serving laboratories everywhere*

AGRICULTURE

Smaller Chocolate Bar

Crisis in chocolate supply as well as in coffee faces the U. S., although for different causes. Virus disease and monopoly are blamed for the shrinking nickel bar.

▶ THE NATION faces a chocolate situation somewhat like the coffee crisis. Monopoly and a virus have been blamed for the shrinking nickel chocolate bar. Flavor of the chocolate also has been shrinking, but for a different cause.

Basic cause of the smaller bar is a poor crop of cacao coupled with rising world demand. As a result the price of cacao, or cocoa, beans from which chocolate is made has almost doubled in the last year.

The Association of Cocoa and Chocolate Manufacturers of the United States has charged that marketing boards in some cocoa producing countries have used "cartel-like or monopolistic" selling policies to make the price artificially high.

Representatives of the Gold Coast, a British African colony which markets all its cocoa through a single board, put the blame for their short crop on a virus disease of cocoa trees. Ordinarily, the Gold Coast supplies about 40% of the world's demand for cocoa beans.

Swollen shoot virus disease has cut production in some Gold Coast areas by as much as three-quarters. The only way of combating the disease is to destroy an infected tree immediately after the disease is noted. The colonial government pays the farmers for the destroyed trees.

The disease is spread by mealybugs which feed on tree sap. An estimated 10% or more of the trees in the Gold Coast are affected by the disease.

An additional problem plaguing chocolate manufacturers is the long-term gradual decline in chocolate flavor. Some people have been saying for years that "chocolate doesn't taste as good as it used to." They are right.

The change has been slow and chocolate manufacturers have juggled their recipes to hide the flavor decline, but they have about reached the end of the recipe rope.

Root of this difficulty is that while all cocoa beans produce chocolate of about equal nutritive value, there is only a small amount of beans of high quality and flavor. Around 1910, producing areas started abandoning the trees giving the flavor beans and concentrated on trees with higher yields but less flavorful beans.

So extensive has been this shift to non-flavor cocoas that chocolate now contains about 20% of flavor beans instead of the 70% that was once used.

Another factor has been the lack of care in preparing beans for market. Cocoa beans are seeds in pods on the trees. The pods are cut open, and the beans removed and fermented before roasting. If the beans are immature or little care is taken in fermentation, the result is an inferior chocolate. Fermentation usually lasts for six full days. After fermentation the beans are dried in the sun.

In recent years, chocolate manufacturers have joined with governments in sponsoring research to bring back flavor cocoas. Much of this work has been done at the Inter-American Institute of Agricultural Sciences at Turrialba, Costa Rica, and at the experiment station run by the government of Ecuador.

Manufacturers have also sent specialists to producing countries to help improve the processing of cocoa. This work has been done in Brazil, which normally supplies 20% of the world demand, second only to the Gold Coast.

Efforts to develop high quality cocoa trees with high yields have started, but there are many difficulties in this project. It takes four years for a tree to produce its first fruit, and a tree's quality can be tested only by sampling the chocolate produced from its beans.

When the beans reach the factory for processing, they are roasted in revolving drums. The roasted beans are then cracked between rollers and the outer shell winnowed out. The remaining "nib" is ground into cocoa butter.

In an attempt to solve two problems at once, the U. S. Department of Agriculture recently sold some of its surplus butter to chocolate manufacturers to be used in extending short supplies of cocoa butter.

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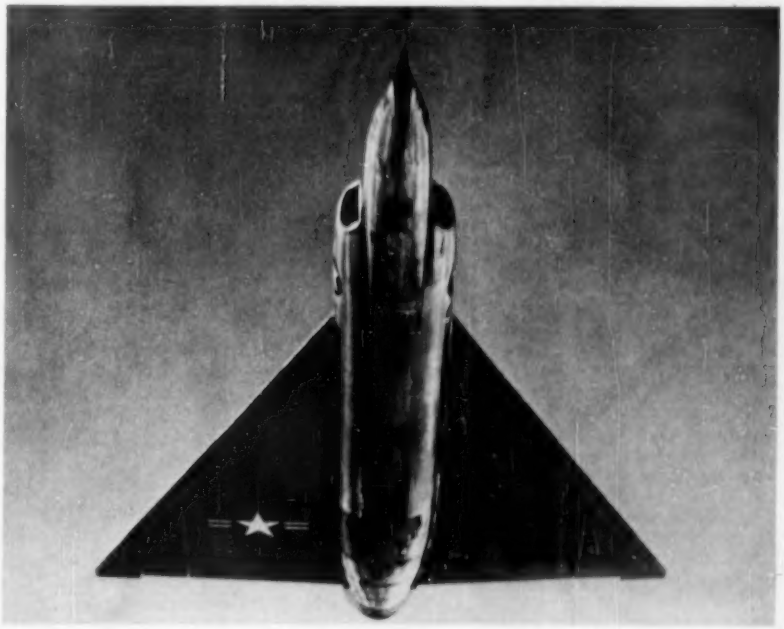
MARINE BIOLOGY

Fish Crosses Pacific Only to End Up on Hook

▶ AN ALBACORE with a real urge to travel swam 4,900 miles across the Pacific Ocean only to end up on a hook. The California Department of Fish and Game has received a marking tag from Japanese fishermen who caught the albacore 550 miles south of Tokyo.

The fish had been tagged 324 days before the catch 18 miles south of Los Angeles. It covered the distance making a little better than 15 miles a day. The Department said this was the first authentic record of an albacore crossing the Pacific.

Science News Letter, March 13, 1954



DELTA WING INTERCEPTOR—Performance details of the U. S. Air Force's new supersonic, delta wing interceptor are still secret, but the first exterior photographs of the F-102 have now been made public. The one above shows its severely swept back wings as well at its lack of the conventional tail assembly. The predecessor of the F-102 was the experimental XF-92, completed in 1948.

PHYSICS

Fantastic Gyro Revealed

▶ SECURITY WRAPS have been removed from a fantastic little machine developed to guide the Air Force's supersonic planes and pilotless missiles automatically.

The little machine is a gyroscope which resembles, in principle, the spinning string-walking toys sold in five-and-dime stores. Made by the Minneapolis-Honeywell Regulator Company, Minneapolis, Minn., the gyros are believed to have unparalleled sensitivity.

If the moon were dotted with cities, the little gyro could measure the width of each city block. If a man standing in Los Angeles could read an ordinary sized newspaper in New York, the gyro could measure the angle his eyes turned through as they moved from the left side to the right side of the front page.

Although primarily created for use in military automatic flight guidance systems, including bombing and gun fire control applications, the gyroscope already has proved its worth in ocean-going vessels and in 60-ton tanks.

Described as "hundreds of times more accurate and sensitive than conventional gyros," the new instrument can detect motion 3,000 times slower than the creeping movement of the hour hand on a watch. It can read angles as small as 1/36,000 of one degree of arc.

Its spinning rotor is floated in a specially developed oily fluid which cuts friction almost to zero. Honeywell engineers say a boy could coast 1,000 miles down a one-foot-high hill if he could get the same low friction between sled runners and snow.

One of the secrets to the gyro's accuracy is its precise speed of rotation. It is "tuned" against a highly accurate crystal oscillator and is checked against the National Bureau of Standards' time signals, picked up on short-wave radio equipment at the Honeywell aeronautical laboratories.

Initial design work on the gyro was done at the Massachusetts Institute of Technology under the supervision of Dr. C. S. Draper. Honeywell engineers took over the developmental work five years ago. More than 10,000 gyros have been mass produced to date, although their capabilities were military secrets.

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MEDICINE

Betatron Treats Brain

▶ PATIENTS WITH mental disease as well as those with cancer may in the future be helped by the 23-million-volt X-ray beam of the betatron at the University of Illinois Medical School in Chicago.

This appears from a report of work so far. All the work, including the brain cancer treatment already under way, is, however, still in the experimental class.

Some 30 patients with brain tumors, both cancerous and non-cancerous, have had betatron treatment. Ten of the 15 with brain cancers have now survived for a year or more in relatively good condition. Conventional X-ray treatment, the report points out, may only give a few months' lease on life.

The future prospect of using the betatron for some mental patients comes from experiments on monkeys. These show that very large doses of X-rays from the betatron can be used to perform a frontal lobotomy. Frontal lobotomy, done to relieve some kinds of mental sickness and also to relieve the pain of hopeless cancer patients, has heretofore been a surgical procedure. Now, it seems, the betatron's powerful X-rays might substitute for the surgeon's knife to make the cut into the frontal lobes of the brain.

Patients being treated by the betatron are under the supervision of Dr. Arthur Arnold, neurosurgeon, and Dr. Lewis Haase, radiotherapist, of the university's medical school. They caution that all brain tumors which are readily reached should be cut out surgically, and that many brain tumors can be treated just as well by the more generally available X-ray machines as by the betatron.

Advantage of the betatron is that it can produce X-ray beams free from side-scatter, more penetrating and with a more uniform tumor dose. The betatron X-ray beam can be compared to a high-powered rifle, while conventional X-rays are more like a shotgun, says a report from the American Cancer Society which is helping finance the University of Illinois betatron work.

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PROJECTS EXHIBITED—Left column, beginning at top: Carolyn Merchant demonstrates models of the animal life found in a fresh water pond; Harold Ward, models of geometrical solids; Charles Stroebel, land formations and fossils found near Rochester, Minn.; Mary Jeanne Kreek, a study of allergies; and Marcian Hoff Jr., synthesizing liquid petroleum type hydrocarbons.

Center column, beginning at top: William Cooper Jr., an inexpensive prism spectrograph; Armand Brumer, complex mathematical curves; Donald Crothers, a study of blood, with emphasis on anemia and leukemia; and Marguerite Burlant, a study of the logarithmic spirals in snail shells.

Right column, beginning at top: Richard Fiddler, computation in systems other than decimals; David Egger, a magnetron for checking the velocity of light; Victor Schmidt, a small, inexpensive planetarium projector; and Susan Lee, crestation, or abnormal growth, in cactus plants. Invited guests viewed the exhibits of the 40 winners.

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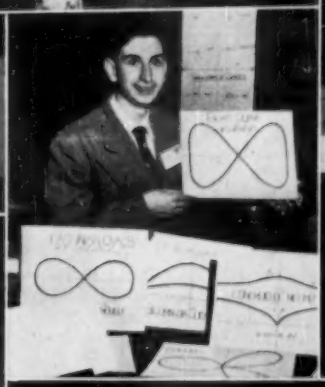
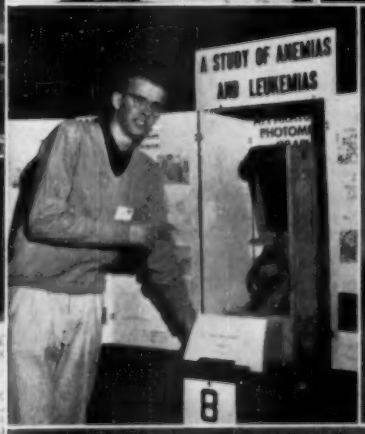
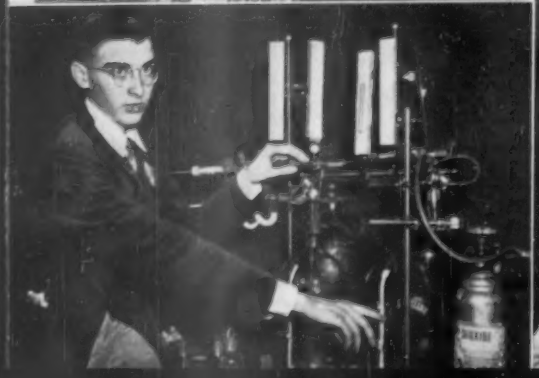



A STUDY OF ANEMIAS
AND LEUKEMIAS



GENERAL SCIENCE

Top Scholarship Winners

Alan F. Haught of Bethesda, Md., is awarded the $2,800 grand prize of the Science Talent Search. Everett C. Dade of Dover, N. H., won the $2,000 scholarship.

See Front Cover

▶ A 17-YEAR-OLD Maryland high school senior, who has probed the mysteries of chemical catalysts, has been named grand winner of the Science Talent Search.

Alan F. Haught of Bethesda-Chevy Chase High School in Bethesda, Md., was awarded the $2,800 Westinghouse Grand Science Scholarship after a five-day competition with 39 other science-minded high school seniors who gathered in Washington from 18 states and the District of Columbia to participate in the Science Talent Institute.

The Science Talent Search, administered by SCIENCE SERVICE through Science Clubs of America, culled the top 40 science students from over 2,000 who completed all the entrance requirements. The 40 winners were brought to Washington to take part in the Science Talent Institute and to compete for scholarships provided by the Westinghouse Educational Foundation.

The young Maryland scientist is pictured on the right on the cover of this week's SCIENCE NEWS LETTER. He took top honors with a project in which, using a homemade spectroscope, he attempted to discover whether some fleeting, unstable chemical compound was formed briefly during a decomposition of hydrogen peroxide in the presence of ferric chloride or cupric chloride.

Alan discovered that some unknown product definitely is formed as hydrogen peroxide disintegrates. Its existence is particularly noticeable when cupric chloride acts as the catalyst. The unknown product revealed its presence to Alan by producing a spectrograph that was different from the normal hydrogen peroxide spectrograph. Spectrographs are to the chemist what fingerprints are to the criminologist.

The tall youth plans to attend Amherst College where he will study science and engineering. He then hopes to enroll at the Massachusetts Institute of Technology for graduate work. Eventually, Alan hopes to help scientists harness the atom to peacetime tasks.

Everett C. Dade, a 16-year-old Dover (N. H.) High School senior, took second place and won a $2,000 Westinghouse Science Scholarship. His award-winning project, titled "A Theorem on Continuous, Non-Differentiable Functions of a Real Variable," is an attempt to construct a new and unusual class of mathematical functions. He plans to study mathematics at Harvard. His picture appears on the left on the SCIENCE NEWS LETTER cover.

For excerpts from the winners' reports, see p. 173.

Eight others received $400 scholarships and the other 30 received $100 scholarships.

Prior to the announcement of the scholarship winners, Lewis L. Strauss, chairman of the U. S. Atomic Energy Commission, told the young scientists that, for the first time since the discovery of fire, man has found in atomic energy a force that can make or break his civilization.

He said President Eisenhower's speech before the United Nations, in which he called for an international pool of atomic products for development to peaceful purposes, stopped world drift and restored moral leadership to the United States.

The AEC chief stated that the independent scientist, such as Edison, is vanishing from the research picture. This is because much fundamental research now is financed by the federal government and, therefore, must be directed toward ends that seem most likely to yield benefits.

Furthermore, advanced research in some fields requires great cash outlays for equipment, something the individual scientist presumably could not afford.

National defense also restricts the areas in which government-sponsored researchers can work, he said. Many new machines and instruments must be developed to tie in with America's security.

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SCIENCE TALENT INSTITUTE SCENES — Left side, beginning at top: Drs. I. I. Rabi, Laurence J. Kulp and Bart J. Bok examine shield used in radiocarbon dating, while some of the 40 teen-aged scientists look on; the three judges, Drs. Harold Edgerton, Rex Buxton and Steuart Britt, congratulate the two top girl winners; Dr. L. S. G. Kovasznay shows an "unfuzzed" picture to James E. Seltzer at the National Bureau of Standards (see SNL, March 6, p. 155); and Dr. Samuel G. Hibben of Westinghouse holds an experimental light for Rep. Walter M. Mumma (R-Pa.) and three of the 40.

Right side, beginning at top: the ten top winners with the three judges, and Dr. L. E. Osborne of Westinghouse, Lewis L. Strauss, chairman of the Atomic Energy Commission, and Watson Davis; Mr. Davis, Dr. Osborne and Mr. Strauss with the two top winners; Dr. Dean Cowie demonstrates the Carnegie Institution's cyclotron; visiting the Naval Ordnance Laboratory; and three former winners, Pierre Conner Jr., Cynthia Wyeth and Alan Goldman, chat with some of the 40.

GENERAL SCIENCE

Winners of Scholarships

GRAND SCHOLARSHIP OF $2,800

Haught, Alan Frederic, Bethesda, Md.

$2,000 SCHOLARSHIP AND ALTERNATE FOR $2,800

Dade, Everett Clarence, Dover, N. H.

ALTERNATE FOR $2,000

Egger, Maurice David, Bakersfield, Calif.

SCHOLARSHIPS OF $400

Brumer, Armand, Brooklyn, N. Y.
Egger, Maurice David, Bakersfield, Calif.
Hoff, Marcian Edward, Jr., Churchville, N. Y.
Kreek, Mary Jeanne, Washington, D. C.
Merchant, Carolyn, Rochester, N. Y.
Scanlon, Edward Patrick, Minneapolis, Minn.
Stroebel, Charles Frederick, Rochester, Minn.
Ward, Harold Nathaniel, Evanston, Ill.

ALTERNATES

1st alt. Levy, Richard Jay,
2nd alt. Rodden, Robert James,

SCHOLARSHIPS OF $100

Baum, Paul Frank, New York, N. Y.
Berry, George Belmont, Jr., South Charleston, W. Va.
Bumby, Richard Thomas, Brooklyn, N. Y.
Burlant, Marguerite, Brooklyn, N. Y.
Carragan, William Dillard, Troy, N. Y.
Cooper, William Samuel, Jr., Greenwood, Miss.
Crothers, Donald Morris, Salem, Ore.
Cyprus, Joel Howard, Wichita Falls, Texas
Davidson, Eric Harris, Nyack, N. Y.
Fiddler, Richard Walter, Kirkland, Wash.
French, Bevan Meredith, Nutley, N. J.
Gansz, Carol Jean, Evanston, Ill.
Hayward, Gary Gillette, Middletown, Ky.
Izzarelli, Anthony William, Fairfield, Conn.
Landisman, Laurel Sydney, Brooklyn, N. Y.
Lee, Susan Huderle, Phoenix, Ariz.
Levy, Richard Jay, Brooklyn, N. Y.
Muffler, Leroy John Patrick, Claremont, Calif.
Oberly, Lorraine Theresa, Allentown, Pa.
Phillips, William, Brooklyn, N. Y.
Rodden, Robert James, New Brunswick, N. J.
Rountree, Janet Caryl, Evanston, Ill.
Sandy, Frank, New York, N. Y.
Scherer, Kirby Vaughn, Jr., Evansville, Ind.
Schmidt, Victor Adolf, Baltimore, Md.
Seltzer, James Edward, Lebanon, Pa.
Simons, David Ralph, Springfield, Ore.
Stillman, Richard Comstock, Forest Hills, N. Y.
Tech, Jack Laurence, Oklahoma City, Okla.
Wolk, Coleman Peter, Westport, Conn.

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TECHNOLOGY

Electric Light Bulb Is "Hot" Three Ways

▶ ONE OF the hottest things in the electric light business today is a new mercury vapor bulb that uses a magnesium germanate coating to give a psychological warmth to its light.

Aside from psychology, the bulb also operates at the fierce temperatures of mercury vapor source. Ordinary fluorescent powders "don't percolate" at these temperatures, Dr. Samuel G. Hibben, director of the Westinghouse applied lighting division, says.

Although the bulbs have been produced commercially just in recent months, it is expected that factory operators, street-lighting officials and baseball park managers also will find them "hot" from an economic standpoint. The popular size consumes 400 watts, gives three times the light of its incandescent brother and has five times the life expectancy.

"It offers the cheapest source of mass white light available today," Dr. Hibben said. Since magnesium germanate fluorescent powder adds red to the blue-green hue of the mercury vapor source, people in its light will not look like walking corpses. Uncorrected mercury vapor light produces a ghostly effect on human flesh.

Dr. Hibben believes the new light will not be suitable for residential use for "quite a number of years" because of its intensity. However, it may be used in large hotel kitchens.

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GERONTOLOGY

Eat More Protein to Stop Withering of Age

▶ EATING MORE protein foods might be the way to stop the withering that comes as people grow old. Even steak, however, loses its appetite appeal for the old folks.

This appears from a report by Dr. Charles S. Davidson of Harvard Medical School and Boston City Hospital, Boston, at a symposium on problems of gerontology held in New York under the auspices of the Johns Hopkins School of Hygiene, Baltimore, and the National Vitamin Foundation, Inc., New York.

The endocrine glands of the body may play a part in the withering and wasting of body tissue in aging, Dr. Davidson said. He pointed to some evidence that not only the sex glands but also the adrenals, pituitary and thyroid glands function at a decreased rate in older persons. This may indirectly change body chemistry so that muscles and other tissues do not get enough protein from the food eaten to keep them up. But, he pointed out, the decreased gland functioning may be not the cause but the result of lack of protein in the body.

Older persons, even when obese, may have a considerable reduction in lean body mass, chiefly muscle. This represents an extensive loss of protein. The percentage of underweight persons increases with age, however, so that by the age of 80 almost half the population is underweight.

"This marked loss of flesh, of lean body mass, must surely," Dr. Davidson said, "be accompanied by a reduction in body protein content."

Feeling lonely and unwanted and having no job may be one reason older persons do not eat an adequate diet. A second reason is an apparent decrease in the psychological reaction to protein foods which most of us have in youth.

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GEOLOGY

Rare Mineral Found In Mexican Tin Mine

▶ A NEW mineral, probably one of the rarest in the earth's crust, has been discovered and described by Dr. George Switzer, geologist at the Smithsonian Institution.

Named ordonezite in honor of a Mexican geologist, the late Dr. Ezequiel Ordonez, the mineral was found in a Mexican tin mine. It is a combination of the elements zinc, antimony and oxygen in the form of tiny glassy-brown crystals.

The rediscovery of an even rarer mineral, mosesite, in Mexico has enable geologists to analyze the mineral for the first time.

Dr. William F. Foshag, head curator of geology, has found that mosesite is a combination of mercury, nitrogen, chlorine and water in a type of chemical bond never found in nature before.

Mosesite was first found in Texas about 40 years ago, but the quantity was so small geologists could not analyze the sample. The rediscovery was made in a Mexican mercury mine.

Dr. Foshag said that the combination of elements in mosesite has never been found in mineral form before. The nitrogen molecule is an ion hooked to mercury in a bond unique in nature.

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AGRICULTURE

5-1 Orange Concentrate For Cloud Stability Urged

▶ FUTURE CANS of frozen orange juice may bear the label "dilute with five cans of water" instead of the usual three if research on super-concentrated juice carried on in Pasadena, Calif., by the Department of Agriculture's fruit and vegetable laboratory is followed up.

Chief drawback to quick adoption of the improved orange product is Florida's law freezing the concentration at three to one.

Less settling of the cloudy particles whose presence goes along with acceptable taste is found when the juice is evaporated to the more concentrated form, it is reported by Drs. Randall G. Rice, George J. Keller, R. J. McColloch and E. A. Beavens in the *Journal of Agricultural and Food Chemistry*.

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IN SCIEN

BIOPHYSICS

Discover Energy Need For Bacterial Motion

▶ ONE OF the electrons that hit your television picture screen furnishes enough energy to keep a single bacterium moving for about three minutes, Dr. Harold J. Morowitz of the National Heart Institute, Public Health Service, has figured.

In more technical terms, the flicking flagellae, or tiny whips, that move bacteria spend energy to move one bacterium at the rate of about 56 electron volts per second. Put still another way, this is equivalent to the energy from burning two molecules of sugar.

Dr. Morowitz' study, reported in *Science* (Feb. 26), was made as a start toward possible future leads to more knowledge of muscle, such as heart muscle. The flagellae of bacteria can be considered single molecule muscles.

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GEOPHYSICS

Suggest Tidal Forces Trigger Hurricanes

▶ HURRICANES CAN be triggered by the tidal forces of the sun and the moon acting on a parcel of air near the equator, Dr. Charles H. Smiley, astronomer at Brown University, Providence, R. I., suggests in *Nature* (Feb. 27).

If this idea is right, he states, there should be an increase in the number of hurricanes shortly before Sept. 23 of any year, and a decrease shortly after that date. For the period from 1900 to 1949, Dr. Smiley finds that there were 40 hurricanes during the week of Sept. 8 to 14, only 17.5 during the week of Sept. 23 to 30.

Such a difference, he says, "might happen by chance once in 50 times." Thus, although "the tidal forces are not large," they could act as a trigger in the formation of hurricanes.

In August of any year, he states, the tidal forces of the sun and moon would tend to make a small parcel of air, near but north of the equator, move in a counterclockwise direction as viewed from above. As the sun moves southward in August and early September, the regions where the strongest atmospheric tides would be found would fall alternately north and south of the equator.

The separation of these two regions would, Dr. Smiley believes, at some time correspond to a natural period of vibration of the atmosphere, thus triggering the immense forces of a hurricane.

Science News Letter, March 13, 1954

CE FIELDS

VETERINARY MEDICINE

Foresees Elimination Of Trichinosis in U. S.

▶ THE DAY is coming when trichinosis, serious, painful and sometimes fatal disease from eating undercooked wormy pork, will be wiped out in the United States. It will come as a result of recent action by most states requiring sterilization by heat of garbage intended for hog feed.

This was predicted by Dr. Benjamin Schwartz of the U. S. Department of Agriculture's Animal Disease and Parasite Research Branch, Beltsville, Md., at the second national conference on trichinosis in Chicago.

Microscopic examination of hogs to detect the trichinae that cause the disease, practiced in Germany and other European countries, would be prohibitively costly in the U. S., he explained.

Aside from garbage-fed hogs, he said, the extent and degree of infection of farm-raised hogs with trichinae have been more or less steadily declining, and have almost reached the point where there is comparatively little danger of humans getting sick with trichinosis from hogs raised in the Corn Belt and elsewhere on farms.

Science News Letter, March 13, 1954

TECHNOLOGY

Surplus Wheat Puffed Into Building Material

▶ STANLEY F. REED, Washington research scientist, has developed a construction material made from expanded and compressed wheat. It is strong, light, weatherproof and insulating, and should sell for about 60% to 70% of competitive products of similar properties.

The puffed wheat board can be faced with metal, wood or plastic, looking somewhat like present construction materials made from sugar cane, bagasse, wood chips, paper, resin foam and plaster.

Developed in response to a challenge from Carl Wilken, agricultural economist with the Joint Congressional Committee on Defense Production, Mr. Reed's wheat product is considered by him to be a demonstration that almost any problem can be solved if enough money, brains and incentive are applied to it. Only a fraction of the money expended in supporting farm products with resulting surpluses would allow research that should give a solution, he contended. Raw material for wheat board costs only four cents a pound.

Something like a billion and a half bushels of surplus wheat will be existing in the United States and Canada this year, it was estimated.

Whole wheat is expanded by heat, bonded with plastics, compressed to about a quarter of its volume under about 300 degrees Fahrenheit heat, to form the board material. Chemicals are added to make it proof against rodents and termites. Thus, in case of famine it will not be possible to eat the walls of houses that have been built of wheat board.

How the process will be commercialized has not yet been determined. Reed Laboratories made the demonstration of research application. Members of Congress are now being consulted for advice on how to proceed with the development.

Wheat board can be used as a structural material in airplanes, various structures that now use other materials similar to wallboard and plywood.

Science News Letter, March 13, 1954

BIOLOGY

Tailless Bull, Cow Have Calf Complete With Tail

▶ THE MATING of a tailless cow and a tailless bull at the Ohio Agricultural Experiment Station, Wooster, produced an apparently normal calf complete with a natural means of switching flies.

The Central Ohio Breeding Association sent the tailless cattle to the Station for mating and observation. The tailless trait in cattle is considered undesirable by dairymen.

The calf proves that tailless cattle are capable of having normal offspring. There is always the possibility, however, that the trait may show up in future generations.

L. O. Gilmore, associate chairman of the Station's dairy science department, pointed out that more matings will be necessary to show that inheritance has a role in producing the tailless abnormality.

Science News Letter, March 13, 1954

ENTOMOLOGY

Slave Traders Carried Chigger Pest to Africa

▶ THE AFRICAN slave trade is credited with introducing to that continent one of the most irritating of native Western Hemisphere pests, the chigger or jigger.

Prof. M. D. W. Jeffreys of the University of Witwatersrand, Union of South Africa, has reported that the little burrowing insect has spread over much of Africa, causing suffering and even loss of limb and life among the natives.

A tiny flea-like insect, the chigger is a parasite on all warm-blooded animals, including man. It digs into the skin of its victim, a tactic for which it may have been tagged with its scientific name *Pulex penetrans*.

The usually accepted dates for the introduction of the chigger in Africa are 1855 and 1872. Prof. Jeffreys, however, has found evidence for its presence as early as 1678.

Science News Letter, March 13, 1954

GERONTOLOGY

End of Growing Marks Start of Growing Old

▶ WHEN TEEN-AGED boys and girls stop growing, they are beginning to age. Or, as Dr. A. I. Lansing of Washington University School of Medicine, St. Louis, puts it,

"Aging begins when growth stops."

He proposed this as a general rule in a report to the symposium on problems of gerontology held in New York under the sponsorship of the Johns Hopkins School of Hygiene, Baltimore, and the National Vitamin Foundation, Inc., New York.

The age of the mother conditions the longevity of the offspring. The greater the age of the mother, the shorter is the life of the offspring.

These findings reported by Dr. Lansing were made on rotifers, minute forms of animal life found in pond water. He believes, however, that the rotifer findings apply to all forms of animal life.

The transition from youth to the process of growing old is "very abrupt," Dr. Lansing reported.

A major mistake in many studies of the aging process has been to compare adults with very old, or senile, persons, he charged. Such comparisons only bring out differences between degrees of senility. To find how a young person differs from an old one, he advises comparisons between adolescents and young adults.

Science News Letter, March 13, 1954

MEDICINE

Deafness From Tumor Or Parathyroid Glands

▶ AN "UNUSUAL" cause of deafness, tumor of the parathyroid glands, is reported by Dr. J. A. Simpson of the University of Glasgow in the *British Medical Journal* (Feb. 26).

The parathyroid glands are situated in the neck close to the thyroid gland. There are four of them, each weighing about two grains. They have an important influence on the body's handling of calcium and phosphorus, and play an important part in keeping the nervous system in a state of best irritability, or excitability, for responding to stimuli.

Increased calcium in the environment of a nerve will lower its excitability. If this happens to the nerve of hearing, the effect would be to decrease the apparent intensity of sound.

Overactivity of the parathyroid glands due to a tumor would increase the calcium in the blood and, presumably, around nerves such as the nerve of hearing. This, Dr. Simpson thinks, is the explanation for the nerve deafness in cases of parathyroid tumor. This nerve deafness is reversible. Removal of the tumor in three cases he reported was followed by return of normal hearing.

Science News Letter, March 13, 1954

TECHNOLOGY

Laminated Baseball Bats

Dwindling hickory and ash forests threaten national pastime. Broken bats are largest ball team equipment expense. Stronger bats result from lamination.

By HELEN M. DAVIS

▶ A HICKORY stick no longer strikes the tune for the three R's at school, but it is decidedly in the center of things in athletics.

The baseball bat, symbol of the great American game, is not what it used to be. It used to be a hickory stick, if a heavy bat was wanted, or, if a lighter one was desirable, it was made of ash. The supply of suitable ash and hickory trees is getting very scarce. Something will have to be done.

High density wood from vigorous young trees makes the most resilient bats. The national pastime uses up millions of bats a year, however, and the production of new trees has not kept up with their consumption.

There is still a lot of old growth hickory around, but a solid hickory bat weighs 33 ounces, and the batter gets more distance with a lighter bat. Ash of any age, the favorite material, is in short supply.

The solution, in which baseball magnates and bat manufacturers have the cooperation of the U. S. Department of Agriculture's Forest Products Laboratory at Madison, Wis., is to stretch the supply of suitable wood.

Laminated Bat Adopted

The result is the laminated bat. The inside, extending down into the handle, is strong, tough hickory, which will take shock. The outside is ash, which will not splinter when it strikes the ball a glancing blow. The parts are glued together with the new resin glues that are stronger than the wood itself.

Conventional bats are just not strong enough. Whether the younger players as they come along pack a bigger wallop than the old-time giants did, or whether old-time trees were tougher than those cut today, the fact is that bats break at a rate alarming to the men who pay the bills. Their cost is now ahead of that of the baseballs, even including those swiped by sentimental fans. A team may start with 12 new bats and consider itself lucky if it has one good one left, after only one day's play. How can scientists of the Forest Products Laboratory help?

The experts on kinds of wood and their sources had first to acquire know-how on making bats. They studied the velocity of a struck ball. They determined that the center of gravity of a bat, to give it the right heft, must be so many inches from the end. They studied the forces revealed by the types of break. They considered from the theoretical viewpoint how many ways a baseball bat can be sliced, and with what results.

There was, of course, prejudice against the first laminated bats. Umpires were afraid that sliced bats might be loaded illegally. But the scientists pointed out that putting a slug of lead into the shaft would certainly not make the bat any lighter, and that possible loading would be easy to detect. Soaring costs and actual scarcity of suitable wood finally led to acceptance of the new type of bat for college games. Professional baseball has just come to the decision to make laminated bats legal for organized baseball leagues, both major and minor. Such bats are being offered by manufacturers for the present season, and players have the opportunity to try them out. Next October may see the first use of the modernized slugging sticks in World Series play.

The scientists, with their interest aroused, are now trying to see whether they cannot make a better bat than a tree can. They are studying the grain of the wood, to see whether laminations can be so arranged that the edges do not curl as wear and tear progress. They believe that a five-piece bat, with the center boxed in, may be better than a three-piece one, which is constructed more like a sandwich.

The problem for the Department of Agriculture scientists extends much farther than baseball. These experts on wood keep an eye on all the major uses for which trees are cut.

SPLIT BATS — Coach "Dynamite" Mansfield of the University of Wisconsin tearfully shows George Heck of the Forest Products Laboratory, U. S. Forest Service, the pile of bats his baseball team has used up.

Ax Handle Problem

Changing forests can bring about an unexpected crisis in any industry traditionally attached to a particular material. For instance, ax handles have always been made of white wood. The supply of white ax handles is growing short. There is a more abundant supply of wood that could make just as good handles, but it is red. Considerable persuasion is needed to sell a man an ax with a red handle, because it is not like the one grandpappy used to make the clearing for the old home farm.

Close to the problem of the laminated baseball bat is the introduction of laminated bowling pins.

In days of plenty, perhaps about the time of Rip Van Winkle, the village carpenter thought nothing of cutting tenpins from the hearts of sturdy oaks. But when modern duckpins came to be manufactured by machinery, it was discovered that one tenth of a tree goes into one bowling pin. The old-fashioned carpenter burned the waste for firewood. Today there are many more economical things to do with waste wood. Again the government experts are helping conserve America's forest resources by wiser use of more parts of each tree.

Plywood's Strength

Lamination is familiar in plywood, in which a layer of wood is peeled from the surface of a revolving log. This layer is then spread out flat and glued to other layers turned cross-wise so that the grain of each layer runs at right angles to that in the layers above and below. Glued and dried under pressure, the alternate directions of the grain strengthen the sheet of finished plywood and make a material that is becoming more popular all the time for walls and surfaces.

Laminated materials are making progress also as structural members, formerly cut in one piece. Not only beams, stringers and rafters for houses have been satisfactorily formed of layers of wood glued together, but curved shapes have been built up to be used as arches in barns, gymnasiums, auditoriums, churches and other buildings

where a large floor space free from pillars is desirable. The strength is satisfactory even for some railroad trestles. The degree of curvature that can be built into laminated structures even allows boats to keep their streamlined outlines, yet have greater strength and stiffness than similar hulls mechanically joined.

Success of laminated structures depends largely upon the glue used to join the sections. Many new types of glue have been developed by modern chemists to supplement the old fish and animal glues, so that the woodworker can now choose from a number of bonding materials.

Casein glue, made from waste milk products, is generally used to hold plywood sheets together. Several kinds of new adhesives are made from resins, allied to plastics in composition.

Studies of each of these types of glue were undertaken by the Forest Products Laboratory during World War II. The armed services wanted to determine which types would hold up best in the kinds of joints usually used in making boxes and furniture. Packaging for the tropics was the immediate problem, as the extreme heat and humidity of tropical conditions is hard on glued furniture.

Variations in durability of glued joints were found, depending on how the pieces of wood were put together. Side-grain to side-grain joints are those used for laminated construction. These joints stood up better in all the tests than the side-to-end joining used to put furniture together. A synthetic phenol-resorcinol-resin type of glue gave the best durability, under conditions far more rugged than those found on any baseball diamond.

Science News Letter, March 13, 1954

METEOROLOGY

Tornado Warnings

► LIVES CAN be saved and property damage minimized if local communities set up a tornado warning system.

At the present time, tornado forecasts cover a wide area, such as a Midwestern state, warning that twisters may occur, but Weather Bureau experts are not yet able to pinpoint the exact time and place they will strike.

A tornado can be spotted as a spinning, funnel-shaped cloud extending toward the earth from the base of a thundercloud.

In addition to a local warning system, such as visual reports to police, communities can use outdated radar sets obtained from the Weather Bureau to keep a vigilant watch for the twisters. (See SNL, Feb. 13, p. 106.) These sets can be modified, for about $10,000, to scan the skies for tornadoes within a 200-mile radius. This is $50,000 less than a new one costs.

Over a dozen communities in Texas are now part of such a tornado-warning system, having raised on their own the money needed to modify the radar sets.

The network will work like this:

Weather Bureau forecasters will alert areas that have conditions most likely to produce severe thunderstorms, from which tornadoes are sometimes spawned. When the bright picture that means a thunderstorm is spotted on the radar screen, the weather observer will try to find out directly from the community what kind of storm is hitting the area.

Knowing that a tornado exists, the weatherman can plot the path it will follow, pinpointing the time it will hit a particular town or city. An advance warning to residents in the twister's path should give them a chance to take proper precautions.

The following safety rules have been suggested by Weather Bureau experts:

1. When time permits, go to a tornado celler, cave or underground excavation.

2. If you are in open country, move at right angles to the tornado's path. If there is no time to escape, lie flat in the nearest depression such as a ditch or ravine.

3. In a home, the southwest corner of the lowest floor or of the basement offers the greatest safety. If you are in a city or town, seek inside shelter, preferably in a steel reinforced building. Stay away from windows.

Science News Letter, March 13, 1954

TECHNOLOGY

Coal-Burning Turbine May Challenge Diesels

► A McGILL University professor has invented a coal-burning gas turbine engine which he believes will challenge the oil-burning diesel's favor with railroad men. By pulling a train four times as far for a given amount of coal, it also is expected to outclass its steam-powered ancestors.

At a recent unveiling of the experimental model, Prof. Donald L. Mordell told high-ranking Canadian government and railroad officials that his engine is more economical, more compact and more powerful than its diesel counterpart.

It burns all grades of coal, even low grades that steam engines cannot use. It extracts 20% to 24% of the thermal energy from coal in contrast to the steam engine's six percent figure. It gets around one engineering "bug" that has plagued previous engines of this sort through use of a new operating cycle which permits only clean air to drive the turbine blades. Formerly, coal-ash damage to these blades was considerable.

Prof. Mordell and his research team in Montreal developed the engine under sponsorship of the Department of Mines and Technical Surveys and with a $300,000 grant from the government.

Science News Letter, March 13, 1954

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• Books of the Week •

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COLOR IN FLOWER ARRANGEMENT—Adelaide B. Wilson—*Barrows*, 128 p., illus., $5.95. For those who love flowers and for those who specialize in decoration and flower exhibits.

CULTS AND CREEDS IN GRAECO-ROMAN EGYPT: Being the Forwood Lectures for 1952—H. Idris Bell—*Philosophical Library*, 117 p., $4.75. An expert on papyri describes what they tell of the amalgam between the religion of the Greeks when they entered Egypt under Alexander the Great and the Oriental cults they found there.

DIFFERENTIAL EQUATIONS IN ENGINEERING PROBLEMS—Mario G. Salvadori and Ralph J. Schwarz—*Prentice-Hall*, 432 p., illus., $8.65. This textbook for engineering students is an outgrowth of courses in engineering mathematics at Columbia University.

ETHNOBOTANY OF THE GILBERT ISLANDS—Katherine Luomala—*Bernice P. Bishop Museum*, 129 p., illus., paper, $2.50. Telling about the care, uses and habits of native plants in an area neglected by botanists.

FLOWER ARRANGEMENT WORKBOOK 2—Myra J. Brooks—*Barrows*, 64 p., illus., $2.50. Containing many illustrations of arrangements for the home for special occasions and unusual effects.

GEOLOGY OF THE BRECKENRIDGE MOUNTAIN QUADRANGLE CALIFORNIA—T. W. Dibblee, Jr. and Charles W. Chesterman—*California Division of Mines*, 56 p., illus., $1.75. This quadrangle takes in a portion of the Sierra Nevada. Mineral resources consist of small quantities of tungsten ore.

GEOLOGY OF THE EEL RIVER VALLEY AREA, HUMBOLDT COUNTY, CALIFORNIA—Burdette A. Ogle—*California Division of Mines*, 128 p., illus., $2.75. One small gas field has been discovered in this area, and several structures remain to be tested for petroleum.

JET AIRCRAFT SIMPLIFIED — Charles Edward Chapel—*Aero Publishers*, 2d ed., 176 p., illus., hard cover $3.75, flexible cover $2.75. A textbook explaining the basic principles and practical applications of jet propulsion.

MAGIC, SCIENCE AND RELIGION AND OTHER ESSAYS—Bronislaw Malinowski—*Doubleday*, 274 p., paper, 85 cents. This work by a leader in anthropology was originally published by the Free Press.

THE MECHANISM OF ECONOMIC SYSTEMS: An Approach to the Problem of Economic Stabilisation From the Point of View of Control-System Engineering—Arnold Tustin—*Harvard University Press*, 161 p., illus., $5.00. The author suggests the use of analogue calculating machines for practical economic prediction and regulation.

THE MIND ALIVE—Harry and Bonaro Overstreet—*Norton*, 333 p., $3.75. Intended to help the reader develop mental health and a sound personality.

NUMBER, THE LANGUAGE OF SCIENCE: A Critical Survey Written for the Cultured Non-Mathematician—Tobias Dantzig—*Macmillan*, 4th ed., 340 p., illus., $5.00. Technicalities are avoided in this book which requires of the reader no more mathematics than that provided by the average high-school education.

PATTERNS OF INDUSTRIAL BUREAUCRACY—Alvin W. Gouldner—*The Free Press*, 282 p., $4.50. A study in industrial sociology; an attempt to document the assumption that it is fruitful to look upon a factory as a bureaucracy.

POWER OF WORDS—Stuart Chase in collaboration with Marian Tyler Chase—*Harcourt, Brace*, 308 p., $3.95. In a sense a sequel to his earlier book, "The Tyranny of Words," which introduced the reader to semantics, this present book discusses cybernetics, communication, perception, and even gobbledygook and Moscow talk.

PYTHIUM ROOT ROT OF BARLEY AND WHEAT—G. W. Bruehl—*Govt. Printing Office*, USDA Technical Bulletin 1084, 24 p., illus., paper, 15 cents. Pythium root rot is one of those constituting a major hazard to cereal crops in the hard red spring wheat area.

UNDERSTANDING THE JAPANESE MIND—James Clark Moloney—*Philosophical Library*, 252 p., $3.50. The author tells us that psychoanalysis, on being imported into Japan, had to be drastically overhauled to be compatible with Japanese political requirements. Instead of stressing adult maturity and individualism, it leads the patient toward more willing conformity to authority.

YOU CAN BE HEALED—Clifton E. Kew and Clinton J. Kew—*Prentice-Hall*, 186 p., $2.95. Twin brothers, one a psychologist and the other a minister, here describe a method of group therapy they have developed for those ill in spirit.

Science News Letter, March 13, 1954

YOUR SKIN AND ITS CARE

By H. T. Behrman, M.D., and O. L. Levin, M.D.

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MINERALOGY

New Golden-Brown Gem Stone Found in Ceylon

► A NEW golden-brown, flashing gem stone found in Ceylon has been identified by mineralogists of the British Museum in London and the Smithsonian Institution.

The gem has been named sinhalite. Dr. George S. Switzer, Smithsonian mineralogist, said the mineral has been used in the jewelry trade for years but was confused with another rare semi-precious gem, peridot. Sinhalite and peridot are practically indistinguishable on surface examination, but their mineral composition is different. Sinhalite is a magnesium-aluminum-boron combination.

Science News Letter, March 13, 1954

GENERAL SCIENCE

Would Speed Research By Security Rule Change

► CRIPPLING DELAYS in "urgent defense research projects" might be avoided and the research correspondingly speeded by a change in security clearance procedure authorizing the responsible officer in the armed forces to interview the person under investigation.

This suggestion is made by Dr. L. W. McKeehan, Capt. USNR (ret.) and professor of physics, Yale University, in an open letter to the Assistant Secretary for Research and Development, Department of Defense. In order to bring this suggestion to as many scientists as possible, Dr. McKeehan published the letter in *Science* (Feb. 26).

The present rule is based on the law requiring certification by a designated officer of the armed forces that persons working on secret parts of a government research contract are acceptable for access to secret security information in the custody of the contractor. The officer bases his decision on a personal security questionnaire and such additional information as he can get from intelligence officers and the FBI.

If the person being investigated formerly lived and worked elsewhere than at the institution appointing him for temporary special services on the defense project, the information may have to come from half a dozen different local offices around the country or even overseas.

When it appears that this procedure will cause "inordinate delay," Dr. McKeehan suggests the responsible officer interview the person under investigation in order to "supplement or clarify the information contained in the Personal Security Questionnaire, to permit open discussion of the delaying circumstances, to provide further guidance for, and more effective pressure upon, supposedly cooperating offices, and to assist generally in reaching a wise and early decision in the case.

"This would appear especially appropriate in view of President Eisenhower's recent statement on the necessity of allowing anyone accused, however obliquely, of conduct or association impairing his reputation, to know about and reply to the accusation."

Science News Letter, March 13, 1954

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GENERAL SCIENCE

STS Winners' Reports

HAUGHT WRITES

"I. Introduction

"I was attracted to the study of catalysis, particularly intermediate products in catalytic reactions, because it is one of the most controversial and least understood areas in the field of chemistry. Scientists disagree as to the mechanism of catalysis. Some hold the theory that intermediate products are formed by the catalyst, while others believe that the catalyst does not enter into the reaction but merely lowers the energy of activation of the reactants.

"By spectrographic means, I am seeking to determine whether intermediate products are formed during catalytic reactions.

"Spectrographic analysis, because of its sensitivity and the fact that unlike other methods it permits analysis of a reaction in process without disturbing the reaction, affords one of the most valuable means of studying catalysis. A search of the A.S.T.M. Indexes to the Literature on Spectrochemical Analysis for the period 1920 to 1945 inclusive, however, disclosed little reported spectrographic research on this subject."

DADE WRITES

"Introduction

"It is well known from the study of elementary differential calculus that a differentiable function of one variable is also continuous. There are also several simple examples of functions continuous and non-differentiable at a point. For example, $f(x)=x\ \sin(1/x)$ at $x=0$ or $f(x)=|x|$ at the same point. However, the construction of a function that is continuous and non-differentiable over a closed interval is a more difficult task. In fact, the existence of such functions was not settled until 1875 when Weierstrass' proof for one of them was published. After this, several others were found, and even some general theorems, such as this one, were proved. One of these functions is associated with the name of Van der Waerden. It is a special case of the theorem that follows, which arises when we set $M_{2M}=1$, $M_{2V+1}=0$. . . .

"The theorem is, as far as I know, original. There is a theorem by Knopp, given in Hobson, The Theory of Functions of a Real Variable, v. 2, p. 407, of slightly different generality which includes some, but not all, of the cases covered by this proof."

Science News Letter, March 13, 1954

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Waldo E. Smith, executive secretary, American Geophysical Union, will discuss "Sciences of the Earth."

AERONAUTICS

Air Industry Still Booms

➤ DESPITE TALK of a business recession, the aircraft industry "still has everything up but the mains'l," and that, the Aircraft Industries Association reports, is reserved for war emergencies.

Post-World War II employment hit a peak in December, 1953, when an estimated 750,000 workers supplied the brains and brawn to meet America's aviation requirements. But Adm. DeWitt C. Ramsey, president of AIA, has predicted that employment will begin dropping gradually in April. This is because the industry has nearly completed its expansion.

As production approaches a maintenance level, aircraft output will drop from about 1,000 to 500 military planes a month. Since military planes represent about 90% of the industry's business, employment also is expected to drop to about 700,000 by the close of December, he estimates.

The aircraft business, second only to the automobile industry as a manufacturing employer, has always had a stop-and-go, peak-and-valley, feast-and-famine character through its 50 years of existence. To prevent a drastic shutdown after the Korean armistice, the industry began alerting Congress, the Department of Defense and the public to the need for long-range procurement policies and programming.

Admiral Ramsey reports that "high military officials and Congressional leaders, recalling the mistakes of the past, have gone on record in favor of such policy and programming, yet specific action to accomplish this objective remains to be taken."

As blocked out by the AIA president, such programming should include:

A strong research program; a sufficiently broad production base within the industry to permit rapid expansion in an emergency; a rate of production sufficient to maintain an important nucleus of engineering and production teams and to provide the armed services with the newest weapons, and a financially strong private aircraft industry.

U. S. aircraft production in 1953 touched 16,200 which was far below the World War II peak when the industry's "mains'l" was up. In 1944, the all-time high of 96,318 aircraft was attained.

In addition to developing a program to ward off atrophy, the aircraft industry is seeking a way to stimulate interest in the aeronautical sciences among America's youth. As one AIA spokesman put it:

"The greatest long-range manpower problem of the aircraft industry is the acute shortage of qualified engineers and scientists. Today, one in 11 aircraft employees is an engineer. This proportion grows larger constantly as the need for research accelerates and increasingly complex military aircraft requires greater numbers of engineering man-hours.

"With requirements mounting, an alarming factor in the engineering picture is the prospective decline in the rate of graduating engineering students. In 1949, for example, 47,000 engineers were graduated from the nation's engineering schools. In 1954, less than one-half of this number are expected to be graduated."

The industry attacked this problem in 1953. It produced two teacher-prepared textbooks for use in elementary schools. "Look to the Sky" promptly drew thousands of orders (see SNL, Oct. 31, 1953, p. 286). The AIA reports that the second book, "Jets," is now being distributed.

Science News Letter, March 13, 1954

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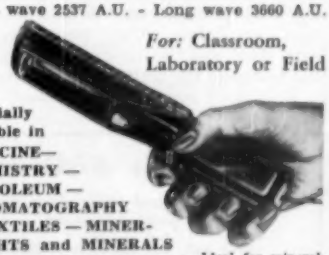

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TECHNOLOGY

Dirt Clings to Nylon Rough Edges and Seams

▶ SOIL PARTICLES cling to nylon rough edges and seams with such determination that cleaning the fabric becomes very difficult. Since nylon fibers have a smooth, hard surface, dirt does not penetrate the fiber to make cleaning the body of a nylon garment difficult.

Research in the Home Economics Research Branch of the U. S. Department of Agriculture has shown, however, that the dirt particles that collect at the rough edges and seams can be almost impossible to get out. The particles appear to be held to the fiber by a kind of attraction.

The recommended practice is to soak the garment in water containing a non-precipitating water softener before washing. This loosens the soil somewhat. Since several of the new synthetic fibers have this quality of attracting soil particles, manufacturers are studying the problem.

Yellowed white nylon can be bleached with sodium perborate or with a very weak chlorine bleach. The Home Economics Branch recommends that white nylon never be washed with other colored fabrics.

Science News Letter, March 13, 1954

AERONAUTICS

Rockets Rescue Plane In Tailspin Tests

▶ ROCKETS MOUNTED on the unswept wings of a training plane have successfully rescued the craft in tailspin tests.

Sanger M. Burk Jr. and Frederick M. Healy, both of Langley Aeronautical Laboratory at Langley Field, Va., reported to the National Advisory Committee for Aeronautics that the results of a test involving an actual plane closely matched those of wind tunnel tests. A scale model of the trainer was used in the indoor tests.

If these findings are used, pilots who spin-demonstrate new military planes during acceptance tests may be in a safer spot than ever before. Until now, parachutes have been attached either to the wing or tail to rescue the craft in emergencies.

Science News Letter, March 13, 1954

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BOTANY

NATURE RAMBLINGS

Hepatica

▶ IF YOU look sharp as you make your way about the woods, you may see the hepatica in flower. It is the earliest of the common woodland plants.

The flowers are white, pink or bluish. They stand in fresh contrast to the tough winter-purpled leaves of the previous season's growth.

The striking feature of this earliest of spring harbingers is the characteristically shaped leaves. Long ago it was noticed that the three-lobed leaves are suggestive of small livers. Hence the name "hepatica," which means liver-like.

Hepatica is an evergreen that is found frequently in association with pines, spruces, and cedars. It is usually found in shady spots standing in a rich well-drained loamy soil. It has a thickish hairy stem and the foliage lasts from one season to the next.

The liver-shaped leaves do not wither and die. Instead they seem to weather the cold in much the same way a boy's lips do when he swims in the creek too long: that is, they take on a purplish cast. It is usually easy for this reason to distinguish between this spring's leaves and last summer's. The newer leaves are not only smaller, they are also greener.

Following the ancient doctrine that any plant or plant part that looked like an animal or animal organ was supposed to be good for the ailments of that organ, medical men of bygone days used to make pungent brews and potions of the little hepatica plant which were used to treat liver ailments.

Because of its early springtime appearance, some gardeners favor using it in borders, or in a rockery where it thrives on the north or east slope. It is very easy to propagate by dividing the roots. This method is favored over seed propagation, because with seed you have to wait until next season for flowering.

Science News Letter, March 13, 1954

ELECTRONICS

New Tube Designs Ease Radio-Gear Maintenance

▶ THE TROUBLE-FREE life of airborne radio and radar is being extended through new vacuum tube designs worked out at Aeronautical Radio, Inc., a research firm in the District of Columbia under contract to the Navy.

Akin to the tubes in home radio or television sets, these vacuum tubes form the heart of the specialized equipment that guide commercial and military planes on their flights, and that aim antiaircraft guns at enemy planes.

Commercial tubes were found to be too frail to withstand the gaff of service in the skies and rough handling by ground crews, an ARINC study revealed.

After analyzing 88,500 tube failures, the research group worked out new specifications and arranged for small-scale production of the experimental designs. Over 14,000 of these new tubes were checked in service and were found to last two to four times longer than their commercial brothers.

Science News Letter, March 13, 1954

Questions

BIOPHYSICS—How much energy does a bacterium use to move for three minutes? p. 168.

□ □ □

ENTOMOLOGY—When and how was the chigger introduced into Africa? p. 169.

□ □ □

GERONTOLOGY—When does a person start growing old? p. 169.

□ □ □

MEDICINE—How could a betatron help those with mental disease? p. 164.

□ □ □

TECHNOLOGY—What is a suggested solution to the wheat surplus problem? p. 169.

What new type of baseball bats are now being tested? p. 170.

□ □ □

Photographs: Cover and pp. 165 and 167, Fremont Davis; p. 163, Consolidated Vultee Aircraft Corporation; p. 170, U. S. Forest Service, Forest Products Laboratory; p. 176, Northrop Aircraft, Inc.

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FURNITURE PAINT contains a newly discovered resin which seals off the wet surface so that dust and dirt specks are not embedded during the drying process. It dries evenly to a professional hand-rubbed look and contains no lead pigments that can harm children who nibble on the articles it protects.

Science News Letter, March 13, 1954

PEARL SPRAY is packaged in an aerosol can and is designed to produce a mother-of-pearl finish on almost any surface, including cloth, glass, wood, leather, ceramics, paper and metal. The spray is transparent, permitting the under color to show through. It comes in a kit with suitable under colors, thinner and a small paint brush.

Science News Letter, March 13, 1954

CLAM SHELLS, polished to a pearly finish, provide a novel way of serving sea foods, eggs, vegetables and meats on special occasions. The shells are about five inches long and will not crack, discolor or become dull in luster due to heat or cold.

Science News Letter, March 13, 1954

EXPLOSION SUPPRESSOR makes empty fuel tanks on boats virtually explosion-proof. The device is a wire canister filled with dry ice, shown in the photograph. Lowered into the empty fuel tank, it emits enough carbon dioxide to nullify fire and explosion dangers. It was originally developed for use with the U. S. Air Force's F-89 Scorpion interceptor.

Science News Letter, March 13, 1954

HEAT-SHIELDING SUITS, made of glass fibers and cloth, protect industrial workers who must operate in high-temperature areas. Up to 500% lighter than conventional protective clothing, the garments have aluminized coatings which help to keep the wearers cool by reflecting heat.

Science News Letter, March 13, 1954

INDIVIDUAL SIZZLING platters for cooking hamburger retain the natural juices of the meat during broiling. The small platters can be transferred directly to plates and the meat can be served just as it was cooked. They can be rinsed clean easily after the meal.

Science News Letter, March 13, 1954

SILICONE LEATHER preservative keeps work shoes and leather equipment soft and pliable despite deteriorating influences present in many industrial plants. Swabbed on the leather, the silicone coats individual fibers, permitting the leather to "breathe," yet keeping out water and oil.

Science News Letter, March 13, 1954

PLASTIC PANES for the windows of industrial plants are designed to help reduce damage in the event of an explosion by blowing out of their frames, giving vent to the built-up pressure inside. In addition to helping to prevent damage to the wall, the shatterproof panes eliminate the hazard of flying, sharp-pointed glass fragments.

Science News Letter, March 13, 1954

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Do You Know?

The National Arboretum in Washington has 450 different azalea *plants* growing.

Chicago had its cleanest year on record in 1953 with an average monthly *dustfall* of 53.61 tons per square mile.

The total number of visitors to the 180 areas under the National Park Service set a new record in 1953 with 46,224,794 *people*.

Industrial output of countries west of the Iron Curtain has increased to 140% of the pre-war average.

A "rubber" *stamp* has been made of transparent plastic so draftsmen can see where the impression goes.

Less than five percent of the *salt* produced in the United States is consumed in the home, the rest is used commercially.

Tiny droplets of a sulfur-containing thioaldehyde compound produce the tears when an *onion* is cut.